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CREATIVE INDUSTRIAL DESIGN WITH 3DEXPERIENCE® CATIA

From product design to consumer experience with Design Thinking



WHAT IF WE APPROACHED PRODUCT DESIGN WITH A DESIGN THINKING MINDSET?

In an increasingly competitive global economy, designing an appealing product is no longer enough: consumers are looking for innovative products that offer a unique, comprehensive experience. Companies and industries must shift their focus from conventional product design to the creation of sustainable, holistic consumer experiences. Designers must take into account future users at every step of the product development process, from their needs, to the inception and use of the product.

To facilitate this transformation, creatives, design studios and companies have been applying the Design Thinking approach to identify, create and bring to market new consumer experiences.

In this e-book, we will provide an overview of the user-centric Design Thinking approach before delving into how the **3DEXPERIENCE** platform on the cloud supports each of its stages. You will learn how designers and creatives can use **3DEXPERIENCE** CATIA's Creative Design portfolio to build upon the classical Design Thinking approach and innovate.

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Design Thinking is a human-centered approach that applies to a wide range of challenges and industries. This multidisciplinary approach consists of five steps that allow designers to innovate based on user experience in a non-linear and iterative way.



HOW IT WORKS

The Design Thinking method allows creatives to design innovative consumer experiences by factoring in the various levels of interaction and interconnection between humans, products and their environment. It is an agile method that takes into account user experience every step of the way, meaning that changes can be made at any moment, by any project stakeholder. If user feedback requires it, previous steps can be revisited and product parameters can be redefined.

For designers, this means transitioning from product design to sensitive consumer experience design. To achieve this, designers must constantly communicate and collaborate with every stakeholder involved in the creation process.

Cross-functional teams must understand future users and their needs before design begins, and incorporate the results of their research into a conceptual design. Iterating early and often, involving every discipline from the start and keeping a firm focus on the wants and needs of customers enables designers to get their design right the first time. As a result, they can **accelerate product development and lower costs as well as material usage to design sustainable and innovative products tailored to customers' needs.**

3DEXPERIENCE CATIA allows creatives to implement the Design Thinking approach by providing tools that connect humans, data and a unified virtual environment with a single source of truth. Creatives can make informed decisions at any time and at any stage of the development process.

The **Design Thinking** approach fosters innovation through its three pillars:

- **Desirability:** centered around user experience, it addresses customers' needs
- **Feasibility:** centered around technology and organization, it assesses the possible solutions to fulfill customers' requirements
- **Viability:** centered around business and performance, it gauges if the business model of the solution is sustainable

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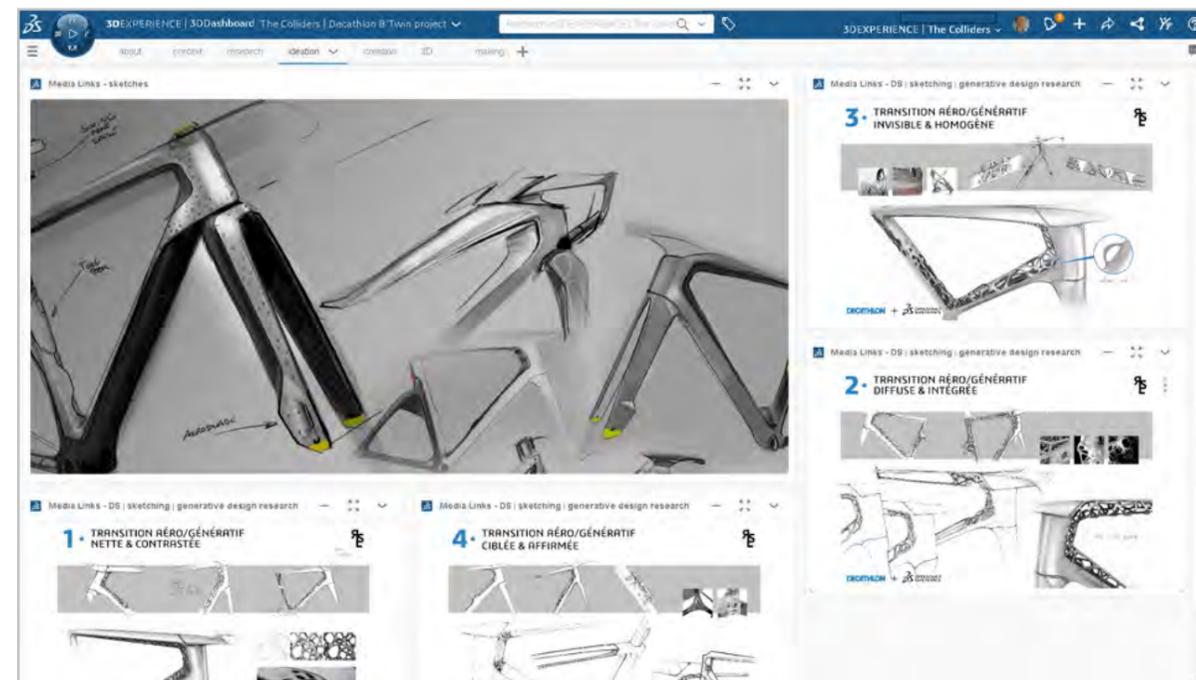
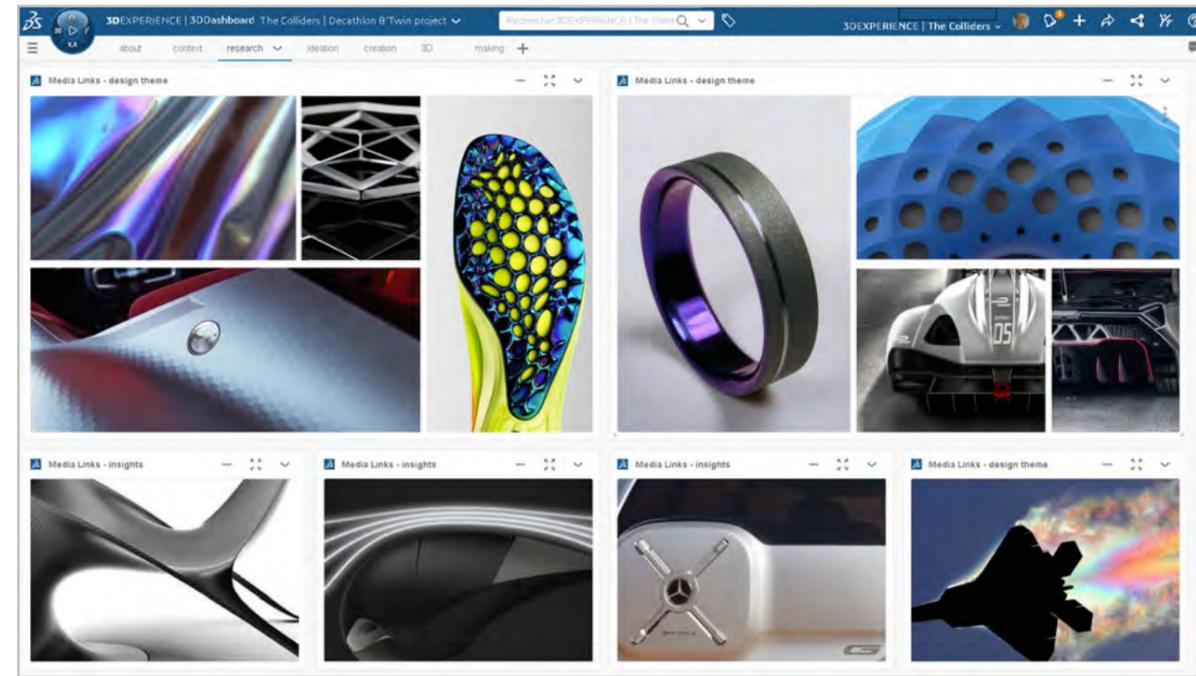
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At the beginning of the product development process, creatives have to understand and identify what users need as well as determine how that translates to their future product. They must define the product they will design and evaluate how it can improve user experience.

Gathering information and getting input and visibility from all contributors on the project early on is essential to creating a user-centric product. Designers need comprehensive collaborative tools that give everyone the possibility to give their feedback without losing data and spending time on back-and-forths.

The **3DEXPERIENCE** platform on the cloud enables you to bring everyone together with up-to-date data in a single unified environment, from anywhere and at any time. Combine design, engineering, systems engineering, manufacturing and even marketing solutions on a single cloud-based platform to improve collaboration and enhance innovation.



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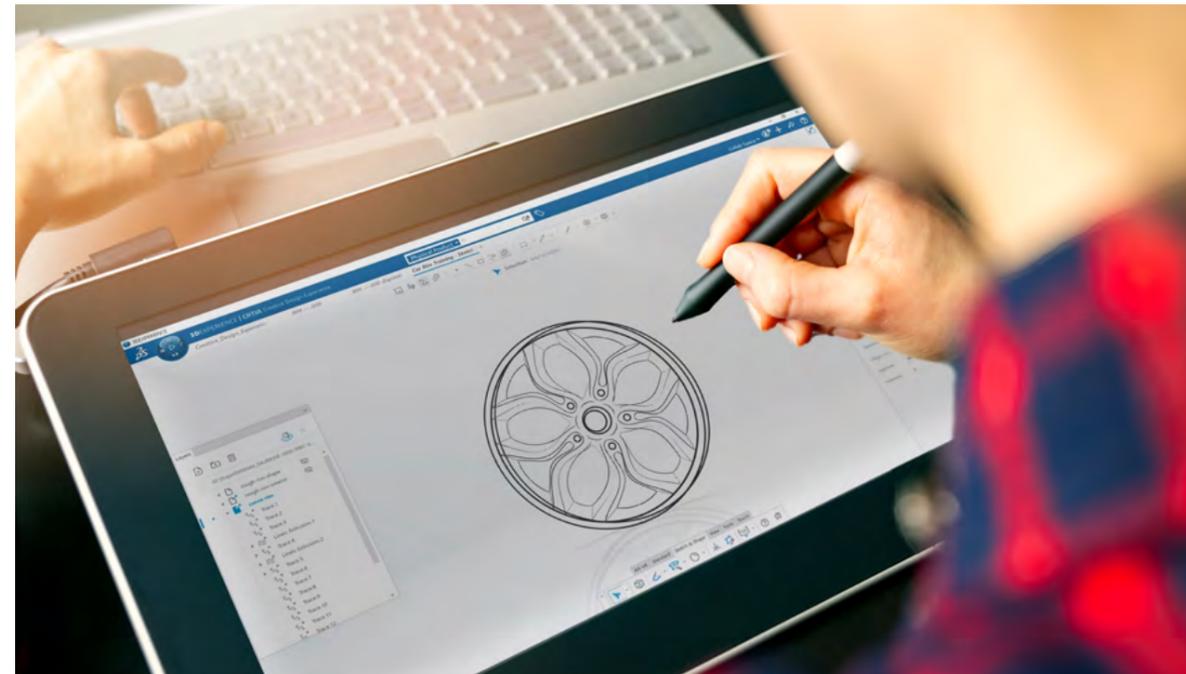
1. IDEATE YOUR PROJECT

Draft your concept

Once you have identified the consumer need and defined how to answer it, you will need to gather ideas to start designing your future product. You can assemble concepts, thoughts and images in one place with the **3DEXPERIENCE** platform's collaborative tools. Draft your ideas and share them with your peers with virtual workshops, white boards or mind maps.

Draw your vision

Sketching is a quick and reliable way to bring your ideas to life. From the start, sketching using an application that helps you style your design will determine its feasibility and provide a clear pathway to development and production. You can quickly express and communicate your creativity with innovative and intuitive 3D sketching ideation tools on **3DEXPERIENCE CATIA**.



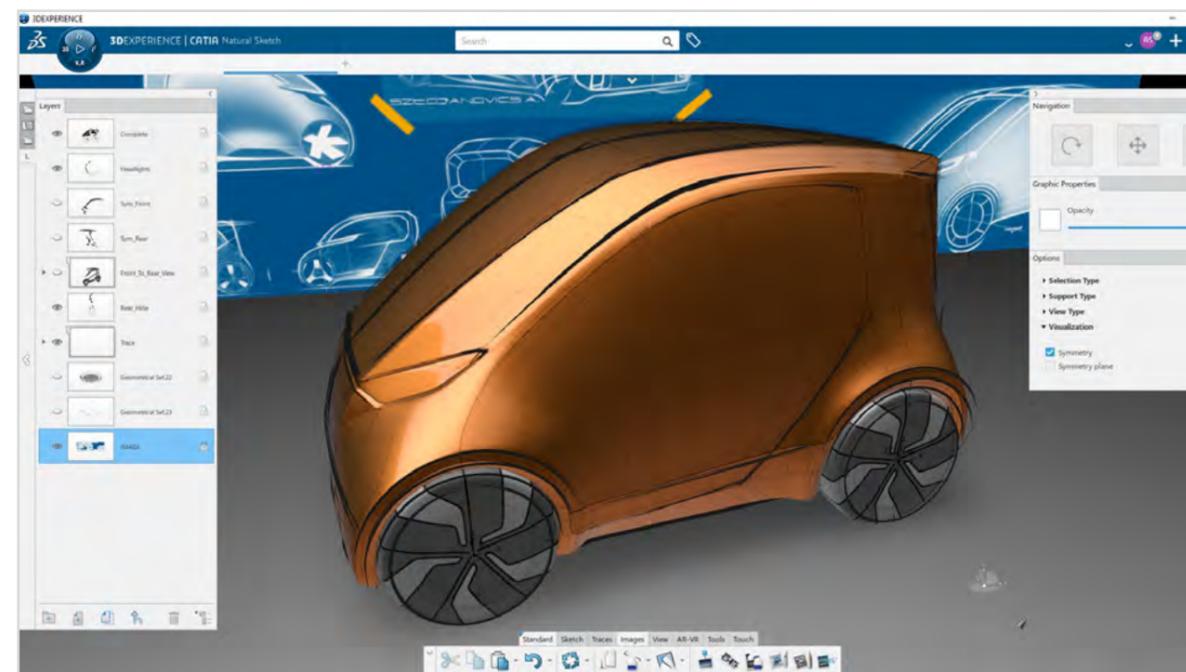
Key features:

- Create surfaces and renderings
- Sketch and edit curves and shapes with a stylus or a mouse
- Adjust sketching parameters including stroke width, color and pen pressure to achieve the look and texture you want
- Import 2D sketches and photos and virtualize real objects



Sculpt your ideas

Once your sketch is ready, you need to give shape to your ideas. **3DEXPERIENCE** CATIA applications provide designers with tools to sculpt virtually with ultra-fast virtual clay. Using flexible subdivision surface technology, rapidly model both simple and complex shapes using wireframe and surface features. Easily explore design variations and evaluate different alternatives without having to create new models from scratch when you are first shaping your product, reassessing it or implementing stakeholder feedback later on.



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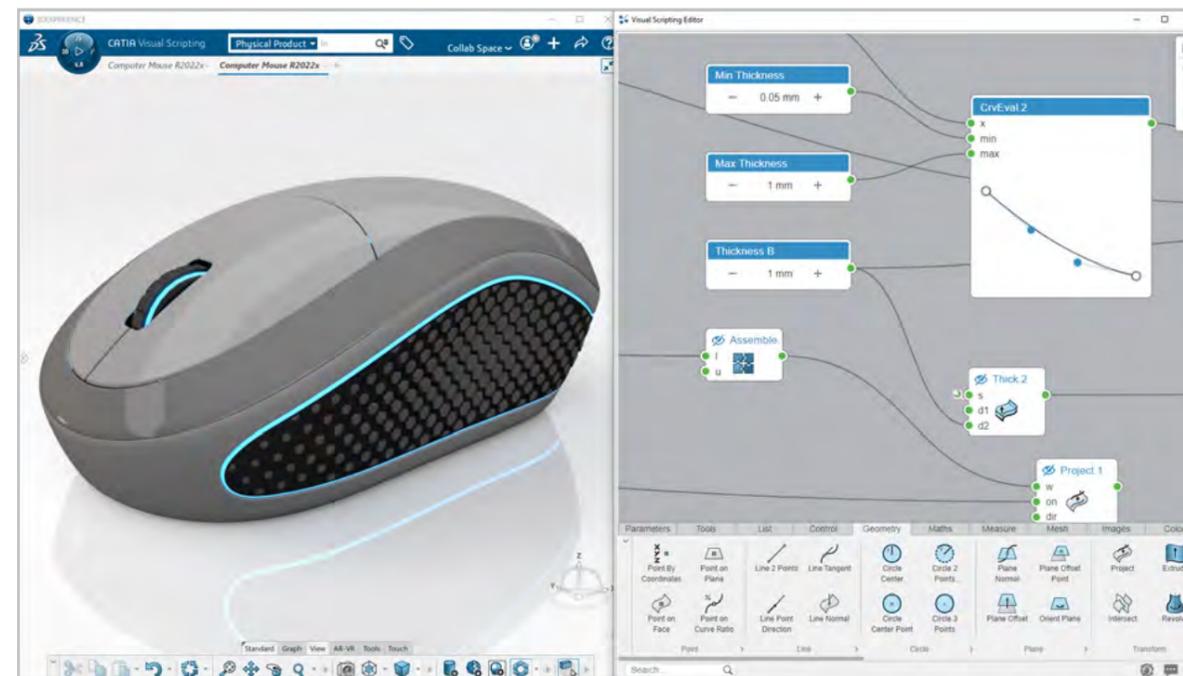
2. 3D MODEL YOUR IDEA

Explore different shapes with algorithmic generative design

After you have given form to your idea, you need to model your project and add more details to it.

CATIA's design by algorithm applications allow you to design creative shapes and patterns – including advanced wireframes and surfaces – using parametric modeling technology with a high degree of automation. Beginners and experts alike benefit from a progressive user experience that combines 3D modeling and graph-based visual scripting to create bio-inspired shapes. You can even model soft materials like leather, plastic, and fabric as well as their behaviors.

Expert designers in code can go a step further and create their own scripts. The generated geometries are immediately reusable for downstream activities like detailed design, template instantiation and manufacturing preparation. Whether you work in the 3D immersive view or in the graphical scripting interface, you can design accurate geometries through a set of logic operations defined by input and output parameters.



Perfect your surfaces

The finish of your product can make the difference between a great and a bad impression. Not only must your product be functional but it must also be refined. As a designer, you need to create high precision surfaces, detect subtle surface problems and check for compliance with regulations.

3DEXPERIENCE CATIA enables you to create different types of surfaces with a single command and visualize them in 3D in real time. Accurately visualize every subtle shadow and reflection as the lights hit each part of the object's surface, exactly as it would appear in reality.

Key features:

- Mix and match different mathematical approaches and design methodologies simultaneously
- Fully integrated and unified workflows
- Switch between different modes to determine whether a design modifies the geometry or not with robust soft parametric technology
- Turn associativity on and off according to user preferences and needs



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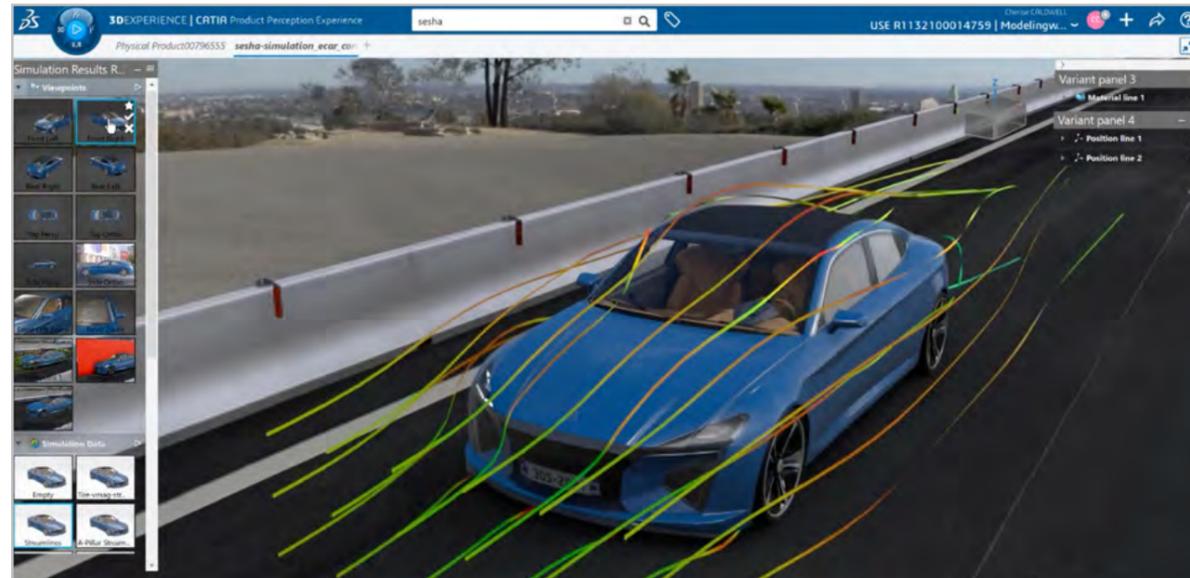
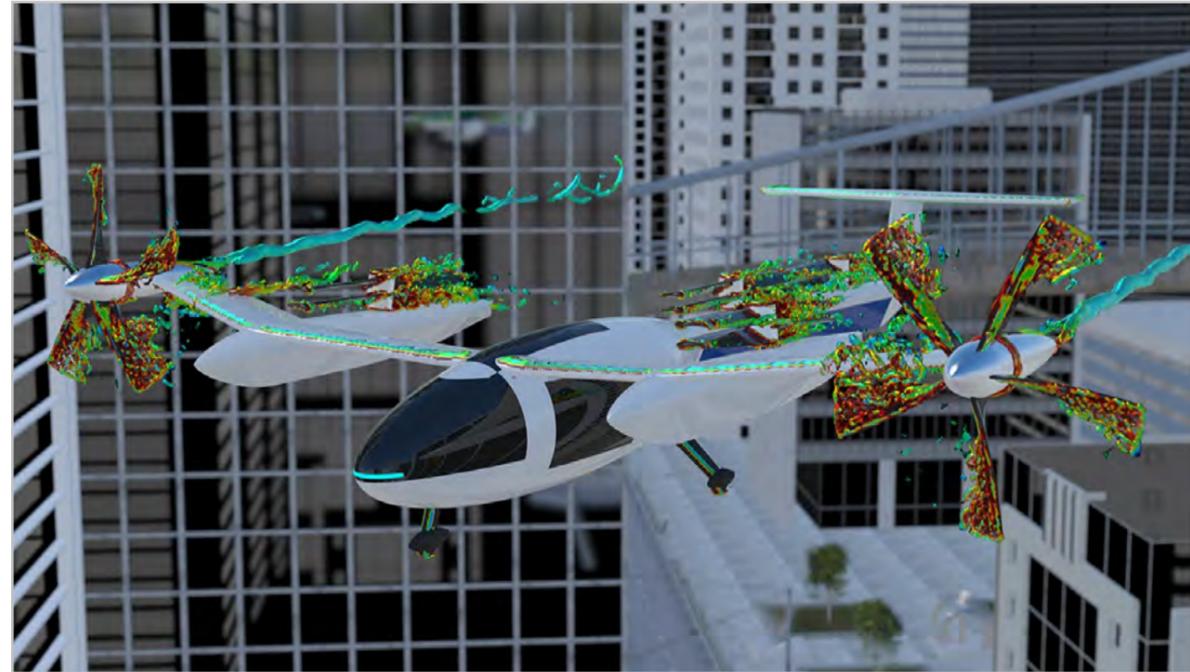
To make sure your product best withstands constraints, adheres to environmental standards and meets customer needs, you will need to simulate how it interacts with its environment.

Design teams working on the **3DEXPERIENCE** platform can evaluate product performance and reliability early in the design process by using an integrated Modeling and Simulation (MODSIM) approach. MODSIM enables you to overlay simulation data on your design and visualize how different elements like load, air or water affect the product. You can collaborate easily with engineers or simulation experts to make the necessary changes, or even perform your own simulations as you design.

Integrated MODSIM can help you speed up your product development and gain key insights into performance metrics. Get your design right the first time and minimize or even eliminate the need for physical prototyping and testing altogether. Make informed choices to create innovative, more sustainable products.

Designers can also easily create different variants to optimize product topology with CATIA Functional Generative Design: minimize part weight, maximize stiffness, reduce costs and optimize material usage.

Explore, compare and assess the structural behavior of your product to see how it withstands frequency, displacement or stress constraints as well as manufacturing constraints. Refine your results and obtain a product that is not only functional, but also more sustainable and durable over time.



MODSIM unifies the capabilities of CATIA® and SIMULIA® within the 3DEXPERIENCE platform on the cloud for a streamlined workflow that delivers valuable insights across disciplines. With its common user interface and single data model, the platform is a single source of truth that enables cross-domain teams to work in parallel without the hassles of file conversion.

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4. VIRTUALLY VISUALIZE YOUR PROJECT

Once your design is ready, you will need to visualize it in context to assess the outcome of your product as well as to show it to project contributors and get their feedback.

3DEXPERIENCE CATIA's rendering capabilities provide real-time visualization of 3D models, enabling designers as well as other stakeholders to see how the product will look in different materials and lighting conditions. Advanced rendering algorithms allow you to produce photorealistic images with a wide range of materials and textures. The user interface provides options to adjust lighting, materials and reflections to fine-tune the appearance of your designs. The real-time nature of the tool enables you to quickly iterate on your designs to achieve the look and texture you want.

Designers can also quickly prepare and orchestrate design reviews with multiple variants. Change material, ambiance or illumination as well as add annotations, labels and graphics to easily communicate specific design changes to any stakeholder on the project. Design, engineering, simulation and marketing stakeholders have access to the same data and can visualize the product as well as make adjustments before sharing them easily with everyone involved on the project. You can even create an animated mannequin to show how future consumers will interact with the product.



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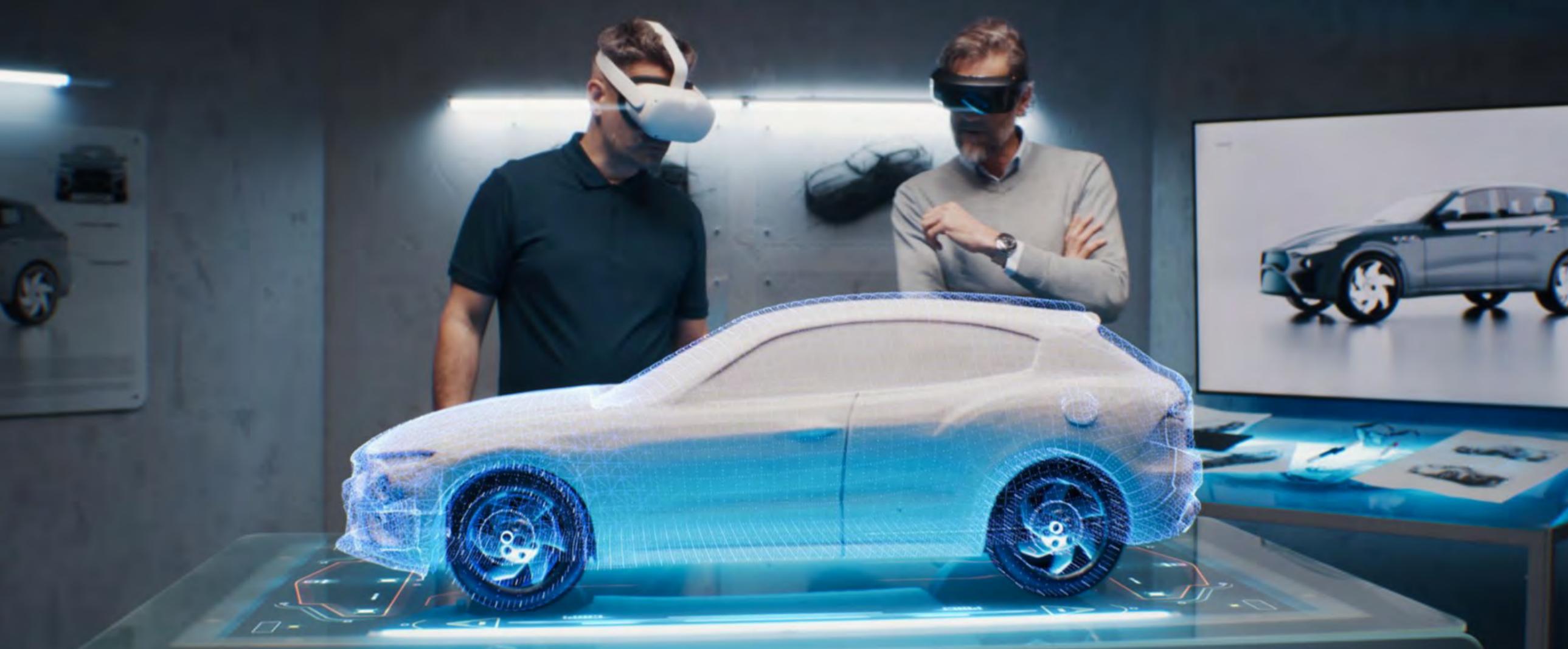
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5. TEST FUTURE CONSUMER EXPERIENCE

To go further and simulate future consumers' experience, **3DEXPERIENCE** CATIA allows you to create diverse human avatars to see how users can interact with your product. Improve your design by testing out different human proportions and postures in the early concept phase and bring emotion into 3D visuals. Create static or animated mannequins and test product use virtually.

You can even enhance the virtual testing phase by visualizing 3D models in real time in immersive conditions with a VR device and experience the product from a future user's point of view.

Lastly, testing out your product with 3D printing can give you an idea of how it will function in the physical world.

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In this e-book, we have seen that the Design Thinking's human-centered approach enables designers to create innovative and sustainable consumer experiences. Applying the method requires collaborative, design and simulation tools that allow every project contributor to rework any step simultaneously, anywhere, at any time. Shifting from a sequential workflow to a collaborative, simultaneous workflow is key to applying the Design Thinking method and is made possible with the **3DEXPERIENCE** platform's cloud-based collaborative tools and **3DEXPERIENCE** CATIA's design applications.

By developing your product with the Design Thinking approach on **3DEXPERIENCE** CATIA, not only will your product be tailored to your customers' needs, it will also be sustainable from end to end, from its inception, to its development and final outcome.

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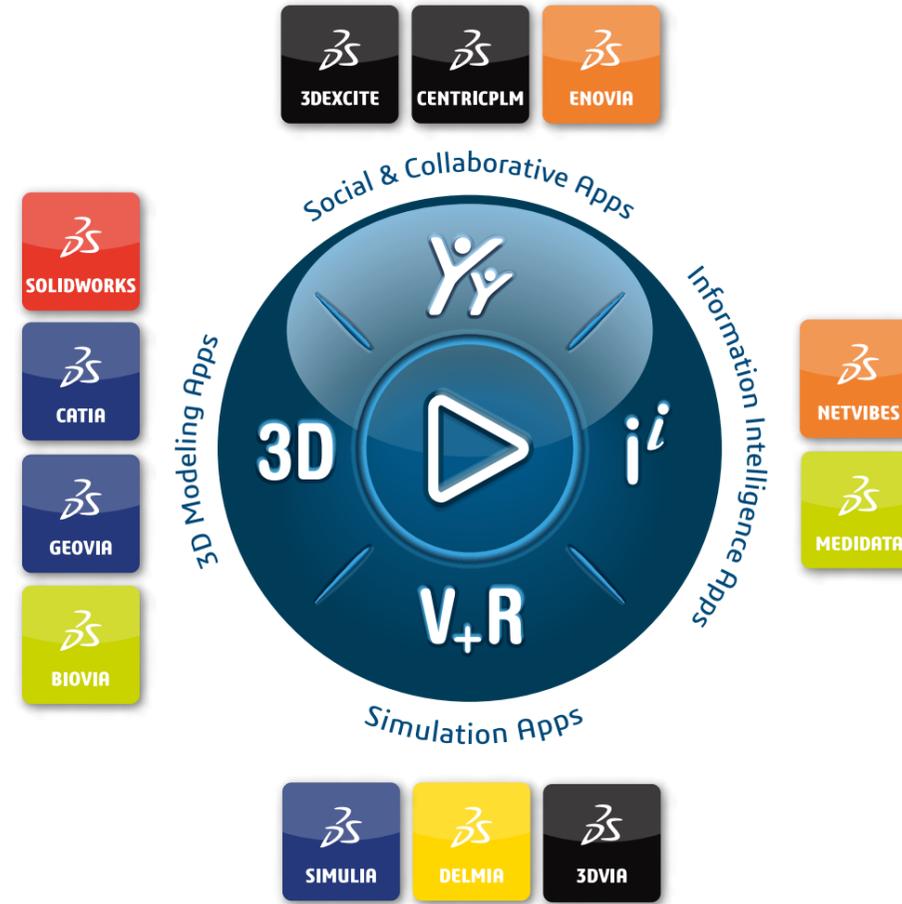
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Visit our website to learn more about the **3DEXPERIENCE** CATIA Design portfolio

Explore further



Our **3DEXPERIENCE®** platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit www.3ds.com.

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